
आइसोप्रोथियोलेन + फिप्रोनिल
इमलसीफायबल कन्सन्ट्रेट — विशिष्टि

Isoprothiolane + Fipronil
Emulsifiable Concentrate —
Specification

ICS 65.100.99

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Isoprothiolane + Fipronil emulsifiable concentrate (EC) is used as fungicide and insecticide in agriculture. Isoprothiolane + Fipronil EC formulation is generally manufactured to contain a mixture of 28.0 percent (*m/m*) of isoprothiolane and 5.0 percent (*m/m*) of fipronil.

In the preparation of this standard, due consideration has been given to the provisions of *Insecticides Act*, 1968 and the rules framed thereunder. However, this standard is subject to the restrictions imposed under the *Insecticides Act and Rules*, wherever applicable.

The composition of the Committee responsible for the formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ISOPROTHIOLANE + FIPRONIL EMULSIFIABLE CONCENTRATE — SPECIFICATION

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for Isoprothiolane + Fipronil emulsifiable concentrate (EC).

2 REFERENCES

The standards listed in Annex A contains provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 REQUIREMENTS**3.1 Constituents**

3.1.1 The material shall consist of isoprothiolane and fipronil, technical dissolved in suitable solvent(s) together with emulsifying agents and with or without stabilizers.

3.1.2 Isoprothiolane, technical conforming to IS 15163 and fipronil, technical conforming to IS 18389 shall be employed in the formulation of the material.

3.2 Physical**3.2.1 Description**

The material shall be in the form of clear, homogeneous, stable liquid, free from visible extraneous impurities. On dilution with water, it shall readily form an emulsion.

3.2.2 Cold Test

No turbidity or separation of solid or oily matter shall occur when the material is subjected to the cold test at 10 °C as prescribed in IS 6940 or at any other lower temperature as agreed to between the purchaser and the supplier.

3.2.3 Flash Point (Abel)

When determined by the method prescribed in IS 1448 (Part 20), the flash point of the material shall be above 24.5 °C.

3.2.4 Emulsion Stability

Any separation including creaming at the top and sedimentation at the bottom of 100 ml emulsion prepared in standard hard water with 2.0 ml of EC, shall not exceed 2.0 ml when tested by the method prescribed in IS 6940.

3.3 Chemical

3.3.1 When determined by the method prescribed in Annex B, the observed isoprothiolane and fipronil content, percent (*m/m*) of any of the samples shall not differ from the declared nominal value by more than the percent tolerance limits given below:

Nominal Value, Percent	Tolerance, Percent	
Up to 9	+ 10 - 5	} of the nominal value
Above 9 and below 50	± 5	
50 and above	+ 5 - 3	

3.3.2 Acidity/Alkalinity

When tested by the method prescribed in IS 6940, the acidity (as H₂SO₄) or alkalinity (as NaOH) of the material shall not be more than 0.5 percent by mass, respectively.

4 PACKING

The material shall be packed in co-ex bottles of capacities 100 ml, 250 ml, 500 ml and 1 litre. The co-ex bottles for packing of material shall conform to IS 9754. These shall be further packed in 5 ply corrugated boxes of 2 litre × 5 litre, 10 litre × 1 litre, 20 ml × 500 ml, 40 ml × 250 ml and 50 ml × 100 ml prescribed in IS 13228. The containers shall also conform to the various general requirements stipulated in 2 of IS 8190 (Part 2).

5 MARKING

5.1 The containers shall bear legibly and indelibly

the following information:

- a) Name of the material;
- b) Name and address of the manufacturer;
- c) Batch number;
- d) Date of manufacture;
- e) Date of expiry;
- f) Net quantity;
- g) Nominal fipronil content, percent (*m/m*);
- h) Nominal isoprothiolane content, percent (*m/m*);
- j) A cautionary notice as worded in the *Insecticide Act, 1968*, and rules framed thereunder; and
- k) Any other information required under the *Legal Metrology (Packaged Commodities) Rules, 2011*.

5.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity

assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

Representative samples of the material shall be drawn according to IS 10627.

7 TESTS

7.1 Tests shall be carried out by the appropriate methods referred to in **3.2.2** to **3.2.4**, **3.3.1** and **3.3.2**.

7.2 Quality of Reagents

Unless specified otherwise, pure chemicals and reagent grade water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities, which affect the results of analysis.

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 1070 : 2023	Reagent grade water — Specification (fourth revision)		determination of flash point — Abel closed-cup method (third revision)
IS 6940 : 1982	Method of test for pesticides and their formulations (first revision)	IS 10627 : 1983	Methods for sampling for pesticidal formulations
IS 8190 (Part 2) : 1988	Requirement for packing of pesticides: Part 2 Liquid pesticides (second revision)	IS 13228 : 2006	Corrugated fiberboard boxes for packing and transportation — Specification (first revision)
IS 9754 : 1981	Specification for high density polyethylene containers for packing of liquid pesticides (up to 1 litre capacity)	IS 15163 : 2002	Isoprothiolane, technical — Specification
IS 1448 (Part 20) : 2019	Methods of test for petroleum and its products [P : 20]	IS 18389 : 2023	Fipronil, technical — Specification

ANNEX B

(Clause 3.3.1)

DETERMINATION OF ISOPROTHIOLANE AND FIPRONIL IN
ISOPROTHIOLANE + FIPRONIL EMULSIFIABLE CONCENTRATE

B-1 PRINCIPLE

The isoprothiolane and fipronil content are determined simultaneously by high performance liquid chromatography using the external standard technique.

B-2 APPARATUS

B-2.1 High performance liquid chromatography equipped with a constant flow pump, sample injector capable of injecting 20 µl aliquots and an ultraviolet detector coupled to chromatography software and printer is used for this determination.

Instrument	HPLC with UV detector and suitable chromatography software
Column	Stainless steel, 250 mm × 4.6 mm internal diameter (i.d.), C-18, 5 µm particle size.
Mobile Phase	Acetonitrile : Water : Phosphoric acid (55 : 45 : 0.01)
Flow Rate	1.00 ml /min
Injection Volume	20 µl
Detector	Ultraviolet detector (280 nm)

B-2.2 Analytical Balance

B-2.3 Microliter Syringe — 25 µl capacity

B-2.4 Ultrasonic Bath

B-2.5 Standard Glassware

B-3 REAGENTS

B-3.1 Isoprothiolane Reference Standard — of known purity

B-3.1 Fipronil Reference Standard — of known purity

B-3.2 Acetonitrile — HPLC grade or equivalent

B-3.3 Water — HPLC grade or equivalent

B-3.4 H₃PO₄ — AR grade or equivalent

B-4 PROCEDURE

B-4.1 Preparation of the Standard Solution

Weigh about 0.056 g of isoprothiolane standard and 0.01 g of fipronil standard into 50 ml standard volumetric flask and add 20 ml acetonitrile, dissolve the solution until all the standard particle dissolved completely and finally make up to the mark with acetonitrile. Now transfer 10 ml by standard pipette into another 25 ml volumetric flask and make up volume with mobile phase.

B-4.2 Preparation of Sample Solution

Weigh a quantity of sample so as to contain 0.056 g of isoprothiolane and 0.01 g of fipronil into 50 ml standard volumetric flask and add 20 ml acetonitrile, dissolve the solution until all the standard particle dissolved completely and finally make up to the mark with acetonitrile. Now transfer 10 ml by standard pipette into another 25 ml volumetric flask and make up volume with mobile phase.

B-4.3 Inject the standard solution **B-4.1** and sample solution **B-4.2** in replicate till consistent readings are obtained and calculate the active ingredients given under **B-5**.

B-5 CALCULATION

Isoprothiolane/fipronil content, percent by mass =

$$\frac{M_1 \times A_2}{M_2 \times A_1} \times P$$

where

M_1 = mass, in g, of isoprothiolane/fipronil standard;
 A_2 = area of isoprothiolane/fipronil peak in the sample;
 M_2 = mass, in g, of isoprothiolane/fipronil sample;
 A_1 = area of isoprothiolane/fipronil peak in the standard; and
 P = percentage purity of isoprothiolane/fipronil standard.

ANNEX C

(Foreword)

COMMITTEE COMPOSITION

Pesticides Sectional Committee, FAD 01

<i>Organization</i>	<i>Representative(s)</i>
Directorate of Plant Protection Quarantine and Storage, Faridabad	DR J. P. SINGH (Chairperson)
All India Biotech Association, New Delhi	SHRI SAURABH SINGHAL SHRI SHAH JI DHAR (<i>Alternate</i>)
Central Insecticide Board and Registration Committee, Faridabad	SECRETARY DR VANDANA SETH (<i>Alternate</i>)
Central Insecticide Laboratory, Faridabad	DR ARCHANA SINHA SHRI SUBHASH CHAUDHARY (<i>Alternate</i>)
Consumer Guidance Society of India, Mumbai	SHRI SITARAM DIXIT DR M. S. KAMATH (<i>Alternate</i>)
Crop Care Federation of India, New Delhi	DR J. C. MAJUMDAR
Crop Life India, New Delhi	SHRI ASITAVA SEN MS NIRUPAMA SHARMA (<i>Alternate</i>)
CSIR - Indian Institute of Toxicology Research, Lucknow	DIRECTOR DR SHEELENDRA P. SINGH (<i>Alternate</i>)
Food Safety and Standards Authority of India, New Delhi	ADVISOR (STANDARDS)
FMC India Pvt Limited, Bengaluru	SHRI CHIRAG PATEL
IDMA Laboratories Limited, Chandigarh	DR INDRA RAI
Indian Agricultural Research Institute, New Delhi	DIRECTOR
Indian Institute of Packaging, Mumbai	DR TANWEER ALAM
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<i>Organization</i>	<i>Representative(s)</i>
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Pesticide Manufactures and Formulators Association of India (PMFAI), Mumbai	DR ARCHANA SRIVASTAVA DR UDAY KUMAR (<i>Alternate</i>)
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SHRI KULDEEP MITTAL
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